DOCUMENT RESUME

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ABSTRACT

Modeling is an important step in the engineering process. In this activity, students create a model of an object of their choice using LEGOs (plastic building blocks), giving them skills and practice in techniques used by professionals. Students sketch as they build their objects. This activity facilitates a discussion on models and their usefulness and uses a time frame of 30 minutes. (Author/SOE)

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Activity: **Build an Approximate Scale Model of an Object Using LEGOs**

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GRADE LEVELS: 3-5

SUMMARY:

Modeling is an important step in the engineering process. Students will create a model of an object of their choice using LEGOs, giving them skills and practice in technigues used by professionals. The students should sketch as they build their objects. This activity will facilitate a discussion on models and there usefulness.

LEVEL OF DIFFICULTY [1 = Least Difficult: 5 = Most Difficult]

3- Average

TIME REQUIRED

30 minutes

COST

Can be none, if the classroom is supplied with LEGOs or the students are able to bring in their own LEGOs. Otherwise LEGO sets can be expensive.

STANDARDS:

2.1 Identify a problem that reflects the need for shelter, storage, or convenience.

2.2 Describe different ways in which a problem can be represented, i.e., sketches, diagrams, graphic organizers and lists.

2.3 Identify relevant design features (i.e., size, shape, weight) for building a prototype of a solution to a given problem.

WHAT WILL THE STUDENTS LEARN?

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SE 060 017

Students will learn what a scale model is and how to construct one. They will also learn about the uses for scale models and why they are produced.

BACKGROUND INFORMATION:

VOCABULARY:

SCALE: the size of a picture, plan, or model of a thing compared to the size of the thing itself

MODEL: a small but exact copy of something

SKETCH: a rough drawing representing the chief features of an object or scene

RECOMMENDED RESOURCES:

www.ptinet.net/~bjepsen/ - for information on scale modeling

modeling.dm.net/ - provides links to several modeling websites

MATERIALS:

LEGOs

Paper

Pencil

PREPARATION:

Obtain LEGOs

Obtain or make a scale model of something the students will be familiar with.

Have the students choose what object they are going to model (you might want to have objects that they pick from, this will help to alleviate the students picking something that is to difficult to accomplish in the time provided).

DIRECTIONS:

1. Explain to students what a scale model is. Show the class your example and discuss with the class why they think that engineers would need to make models before making the real thing.

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2. Have students work alone or in pairs to build a scale model using LEGOs, also have students sketch the object as they build it.

3. You may choose to have students build something specific or have it be open-ended. An easy criterion is to have students build something that is in the classroom, that way they have the object in front of them and there are a variety of objects to choose. Students could also bring an object in from home if you wish. The focus of this activity can be based on a theme or it can be open ended

INVESTIGATING QUESTIONS:

What is a scale model?

How can you depict an object without the actual object?

Why are scale models useful?

Where are they used?

What did you build?

How did you build it?

What is its function(s)?

What other material would you use for the life-size version?

REFERENCES:

None

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Rubric for Performance Assessment						
Activity Title:	Build an Approximate Scale Model Using LEGOs				Grade:	
	1	2	3	4		
Criteria	Beginning	Developing	Proficient	Advanced	Weight (X factor)	Subtotal
DESIGN AND CONSTRUCTION	Design and construction are incomplete.	Scale model shows evidence of hasty construction.	Scale Model shows evidence of careful craftsmanship to scale and appropriate use of LEGOs.	Scale Model shows evidence of very careful craftsmanship and the design is to scale and detailed.		
SKETCH	Model not depicted accurately and dimensions not proportional.	Depicts model, but the dimensions are not proportional.	Shows the model to scale with all of the dimensions accurate.	Model carefully drawn to scale with dimensions proportional.		
DEMONSTRATES UNDERSTANDING	Does not know how to scale down a model or why it is important.	Knows why scale models are important, but unable to put it to use.	Able to explain how to scale down an object to make a model and why this is useful.	Knows how to scale objects and why it is important. Can also provide examples of where scale models are used.		
					Total:	
Teacher Comments:						

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PreK-12
ENGINEERING

Activity Evaluation Form

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Activity Name: _____

Grade Level the Activity was implemented at:_____

Was this Activity effective at this grade level (if so, why, and if not, why not)?

What were the Activity's strong points?

What were its weak points?

Was the suggested Time Required sufficient (if not, which aspects of the Activity took shorter or longer than expected)?

Was the supposed Cost accurate (if not, what were some factors that contributed to either lower or higher costs)?

Do you think that the Activity sufficiently represented the listed MA Framework Standards (if not, do you have suggestions that might improve the Activity's relevance)?

Was the suggested Preparation sufficient in raising the students' initial familiarity with the Activity's topic (if not, do you have suggestions of steps that might be added here)?

If there were any attached Rubrics or Worksheets, were they effective (if not, do you have suggestions for their improvement)?

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http://www.prek-12engineering.org/data/d34/HumanvsNatural.pdf

4) Do Different Colors Absorb Heat Better?, Grades PreK-2
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5) Which Roof is Tops?, Grades PreK-2
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6) Make Your Own Recycled Paper, Grades PreK-2
http://www.prek-12engineering.org/data/d56/Recycle.pdf

7) Build an Approximate Scale Model of an Object Using LEGOs, Grades 3-5
http://www.prek-12engineering.org/data/d3/LegoScaleModel.pdf

8) Design Weather Instruments using Lego Sensors, Grades 3-5
http://www.prek-12engineering.org/data/d4/LegoWeather.pdf

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10) Build a Bird House, Grades 3-5
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11) Ball Bounce Experiment, Grades 3-5
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18) Water Filtration, Grades 3-5
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